

oximetry used in critically ill ED patients may be predictive of neurologic outcome at hospital discharge and adequacy of resuscitation.

Methods: We performed a prospective observational study on a convenience sample of critically ill patients presenting to the EDs of 2 teaching institutions. Patients were enrolled if they presented with an acute alteration of their mental status or were critically ill as defined by a need for emergency resuscitation or intubation. Patients were excluded if they were younger than 18 years, had severe trauma that precluded placement of the cerebral oximetry, or presented with do-not-resuscitate papers. The cerebral oximeter was attached to the patient only during their stay in the ED. Initial and final regional cerebral oxygenation (rSO₂) saturation values, patient demographics, vital signs, and laboratory results were recorded. Neurologic outcome was defined by the Glasgow Outcome Scale (GOS) score at hospital discharge. The GOS consists of 5 categories: dead, vegetative, severe disability, mild to moderate disability, and return to baseline. For statistical analysis, neurologic outcome was converted from an ordinal (1 through 5) to a dichotomous variable (good 4 to 5/poor 1 to 3). Data analysis was performed using descriptive statistics. This study was reviewed and approved by our institutional review board.

Results: A total of 71 patients have been enrolled to date, representing the largest cohort of patients evaluated by cerebral oximetry in an ED setting. Neurologic outcomes were available for 65 (91.5%) of the enrolled patients. Normal rSO₂ values based on previous literature are between 47% and 83%; therefore, patients' rSO₂ values were also divided into 2 groups (ie, those with normal and abnormal rSO₂ values). Sixty-four percent of enrolled patients had a poor outcome. The positive predictive value (PPV) of an abnormal rSO₂ at either the initial or final recording and a poor neurologic outcome was 78.8%, whereas the negative predictive value (NPV) of an abnormal rSO₂ on either recording was 38% for a good outcome. The PPV and NPV of an abnormal final rSO₂ level to predict poor neurologic outcome were 90.0% and 51.1%, respectively. Sixteen patients had abnormal initial and final rSO₂ values; 15 of these patients (93.8% [15/16]) had a poor neurologic outcome. Finally, 13 patients with abnormal initial and final rSO₂ values and who had recorded parameters of resuscitation (ie, base deficits) had abnormal base deficits or an abnormal anion gap acidosis.

Conclusion: Abnormal cerebral oximetry is a good predictor of poor neurologic outcome.

89 Providing Mobile Phones to Emergency Medicine Residents: Perceived Effects on Physician Communication and Work

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Study objectives: Effective communication in the complex emergency department (ED) environment is challenging. In the course of routine care, emergency medicine residents place and receive multiple telephone calls, many that are critical to patient decisions and care. Institutional constraints on resources may limit implementation of effective tools; in our ED, individual mobile telephones were not initially available for most emergency medicine residents. We want to evaluate the perceptions of emergency medicine residents who routinely use mobile telephones, and when additional mobile telephones are being implemented and made available to postgraduate year (PGY)-1 residents, we want to evaluate how the PGY-1 residents' perceptions changed after having routine access to a mobile telephone. Our first hypothesis is that upper-level emergency medicine residents who routinely use mobile telephones perceive improved work habits, efficiency, and satisfaction. Second, we hypothesize that after implementing expanded mobile telephone access for PGY-1 residents and surveying before and after, there will be perceived improvement in the same measures.

Methods: This study was at an urban academic Level I ED with annual visits of 90,000 patients. The emergency medicine residency is a 3-year program with 30 residents. Before the study, there were approximately 20 mobile telephones in use in the ED, reserved for emergency medicine attending physicians, some upper-level emergency medicine residents, and other key support staff. The survey consisted of 12 questions, 7 with percentile responses and 5 with Likert scale (0 to 6) satisfaction/agreement scores. Part 1 of the study was conducted in December 2003, with a survey of upper-level emergency medicine residents. Part 2 of the study was the same survey, administered before and after to PGY-1 emergency medicine residents after additional mobile telephones were implemented (December 2003) and after PGY-1 residents had access for at least 2 months. Data were analyzed using dependent *t* tests.

Results: Part 1 surveys were completed by 18 upper-level emergency medicine residents (90%). Upper-level emergency medicine residents reported access to a mobile telephone during 76.9% of their shifts (95% confidence interval [CI] 63.0% to 90.9%). They perceived missing return calls 11.0% of the time (95% CI 6.0% to 16.1%) and reported waiting around the central working area for a return page about 23.2% of the time (95% CI 9.5% to 36.9%). Regarding use of the mobile telephone, the upper-level residents preferred to call the page operator to place a page, rather than use a posted numeric code system (57.0% versus 33.4%, 95% CI -3.6% to 50.8%). They were satisfied with the current telephone system, with an average satisfaction scale of 4.4 (0 to 6 scale; 95% CI 3.8 to 5.0). Likewise, they strongly perceived that routine use of a mobile telephone would increase their efficiency (5.5 on a 0 to 6 scale; 95% CI 5.1 to 5.9), improve patient care (5.4 on a 0 to 6 scale; 95% CI 4.9 to 6.0), and allow being located easily (5.8 on a 0 to 6 scale; 95% CI 5.5 to 6.0). Part 2 before-and-after surveys were completed by 9 PGY-1 residents (90%). As a measure of implementation, PGY-1 residents reported increased access to a mobile telephone from an average of 2.3% to 91.6% of their shifts (89.3% increase, 95% CI 99.4% to 79.2%). All reported a decrease in perceived missed return calls from an average of 20.3% to 4.6% (15.7% decrease, 95% CI -0.2% to -31.2%), as well as less waiting around the central working area for a return page from an average of 67.8% to 13.9% (53.9% decrease; 95% CI -32.0% to -75.8%). With regard to their telephone usage, there was no significant change in the use of 3 paging systems. After implementation of the mobile telephones, all PGY-1 residents reported an increase in satisfaction with the telephone system from an average of 2.4 to 4.1 (0 to 6 scale, 1.7 increase; 95% CI 0.0 to 3.5). They all believed as well that routine use of a mobile telephone would increase their efficiency, improve patient care, and allow being located easily. That perception remained unchanged after distribution of the mobile telephones.

Conclusion: Providing a personal mobile telephone to emergency medicine residents improves perceived work habits, efficiency, and satisfaction. Resources need to be available to provide tools for emergency medicine residents and other physicians to provide high-quality patient care in the challenging and demanding ED environment.

90 Emergency Department Crowding: A National Perspective

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Study objectives: Our objective in this study is to profile diurnal variability in hourly emergency department (ED) census using the National Hospital Ambulatory Medical Care Survey (NHAMCS).

Methods: A secondary analysis of ED visits in the NHAMCS survey for 2001 was performed. A sample of 34,546 ED visits was used to profile diurnal variability of hourly ED census. A hot-deck method was used to impute missing visit length and arrival time data. The hourly ED census was calculated from the time of arrival and visit length, using survey estimates that incorporated population weights.

Results: The census varied 2.8-fold over the course of the day. The census was 1.8 times higher on days and 2.1 times higher on evenings than between midnight and 7:59 AM. Thirteen and a half percent of ED patients were admitted. Their visit length averaged 74% longer than the average for ED patients who were discharged. Admitted patients constituted 20% to 31% of the hourly census. The highest percentage was during the morning hours. Walkout rates increased from 0.87% in the lowest quartile of census to 1.66% in the highest quartile.

Conclusion: Diurnal variability in ED crowding can be profiled nationally by calculating hourly ED census. ED crowding varies significantly over the course of the day, and admitted patients contribute disproportionately to crowding.

91 Decreasing Emergency Department Wait Times for Available Inpatient Beds by Removing Artificial Variation

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Study objectives: Because increasing emergency department (ED) census and crowding has become a substantial issue, initiatives to decrease waiting times for inpatient beds have become increasingly important. A proportion of the waiting done by patients in the ED is the result of artificial variation within the current system. We decrease the wait time (WAIT) from ED decision to admit (EDADMIT)